University of Hawaii at Manoa

Hawaii Natural Energy Institute
Holmes Hall 246 • 2540 Dole Street • Honolulu, Hawaii 96822

March 28, 1991

Mr. Norman Hayashi
Director
Planning Department
County of Hawaii
25 Aupuni Street
Hilo, Hawaii 96720

Dear Mr. Hayashi:

As required in the County of Hawaii Planning Commission's geothermal resources permit (GRP 89-1), five (5) copies of the January, 1991 monthly report are enclosed.

If you have any questions, please call me at 522-5620.

Sincerely,

Harry Olson
Hawaiian Electric Industries/
Spark Matsunaga Fellow in
Geothermal Energy Research

Enclosure: February monthly report

FEBRUARY 1991 MONTHLY REPORT

Scientific Observation Hole (SOH) Program

Geothermal Resource Permit: GRP 89-1

Lilewa, Kapoho, and Halekamahina, Hawaii

TMK: 1-2-10:01; 1-4-01:02; and 1-4-02:32

Hawaii Natural Energy Institute

University of Hawaii

March 1991

SUMMARY

Site preparations at SOH-2 continued February 1-3, 1991, including the rigging up of the Tonto U-5000 drill rig, the installation of the sump liner for the mud pit, and the installation of a water line from the Airstrip well to the water storage tank to provide water for the drilling operations. SOH-2 was spudded in at 11:30 am on February 4, 1991, with a 101mm diamond core bit and drilled to a depth of 10 feet. The hole was then opened to 12 1/4 inches to a depth of 202 feet by rotary drilling and 9 5/8 inch casing set. Rotary drilling with an 8 1/2 inch bit continued through the month to the depth of 1,871 feet for this reporting period.

A fence will be erected around the SOH-1 wellhead and the sump material is being anaylzed to determine if it is suitable for disposal at the County landfill or if it should be buried on site. SOH-3 remains in the permitting stage awaiting a grading and grubbing permit. The sump material at SOH-4 was buried on site on February 24, 1991, and the Landowner, Campbell Estates, has seeded the site with experimental Mamaki, Popiko, and Ohia seeds collected from plants in the nearby area.

I. INTRODUCTION

This document presents a monthly report to the County of Hawaii Planning Department to support the Scientific Observation Hole (SOH) program in the Kilauea Middle and Lower East Rift Zones. The SOHs are for scientific observation purposes only. The holes will not be flow-tested or produced. The information to be gained from the SOHs will provide an assessment of subsurface geological conditions, groundwater level and composition, temperature, drilling conditions, an inventory of possible mineral and geothermal resources, and an eruptive history of the island to the depth drilled.

This report addresses: occurrence and duration of any start-up, shut-down, and operation mode of any SOH/facility; performance testing, evaluation, calibration checks, and adjustment and maintenance of the continuous emission monitor(s) that have been installed; and emission measurements.

II. BACKGROUND

The County of Hawaii Planning Commission approved, on August 8, 1989, a geothermal resource permit application (GRP 89-1) to drill Scientific Observation Holes (SOHs) in the Kilauea middle and lower east rift zone. This document presents a monthly report, as required in Condition 6:

> "The petitioner shall maintain a record in a permanent form suitable for inspection and five (5) copies shall be filed with the Planning Department on a monthly basis during drilling and for six (6) months after the completion of drilling to establish a hole specific baseline and such record shall be available to the community. The record shall include:
>
> a. Occurrence and duration of any start-up, shut-down, and operation mode of any SOH/facility.
>
> b. Performance testing, evaluation, calibration checks, and adjustment and maintenance of the continuous emission monitor(s) that have been installed.
>
> c. Emission measurements reported in units compatible with applicable standards/guidelines."

As designated, four holes are planned to be drilled along the Kilauea East Rift Zone on the Big Island of Hawaii. Three of the Big Island holes (SOHs 1, 2, and 4) are on agriculture land and have been permitted by the County of Hawaii Planning Commission. The fourth hole, designated SOH-3, is on

conservation land. SOH activities under Conservation District Use Permit (HA 12/20/85 - 1830) issued to the Estate of James Campbell have been approved.

III. SOH-1 SITE

Drilling Activity

Drilling is complete. The County of Hawaii, Department of Water Supply was contacted in February to remove the water meter, which had monitored the water usage for the drilling operations at the SOH-1 site. The water meter removal is scheduled for the last week of March. A fence will be erected around the SOH-1 wellhead after a determination is made by the Department of Health regarding the disposal of the sump material. The site will be reclaimed to its original state after testing and monitoring are completed.

Monitoring Program -

Air Quality, Meteorological, Noise and Emissions are not monitored, as drilling has been completed at this site.

IV. SOH-2 SITE

A grading and grubbing permit was approved on December 4, 1990, and the site was cleared on January 25, 1991. A cement pad was poured and the site preparation completed January 29-31, 1991. Site preparations at SOH-2 continued February 1-3, 1991, including the rigging up of the Tonto U-5000 drill rig, the

installation of the sump liner for the mud pit, and the installation of a water line from the Airstrip well to the water storage tank to provide water for the drilling operations. SOH-2 was spudded in at 11:30 am on February 4, 1991, with a 101mm core bit. Rotary drilling continued to a depth of 1,871 feet for this reporting period. Water is being used as the primary drilling fluid and due to the inability of the water pump and the insufficent size of the water storage tank on site to keep up with the rotary drilling, delays have occurred waiting on water deliveries.

Monitoring Program - Air Quality

The air quality monitoring station provides a continuous record of atmospheric H_2S concentrations when interfaced with a data logger or chart recorder. The unit is located in a utility container on-site and power is provided by the drill rig system.

This station was set-up, tested, and calibrated on February 1, 1991, and came on line when the drill rig was powered up on February 4, 1991. This station operated normally with minor adjustment and calibration until February 22, 1991, when a short-circuit was discovered in the power supply line to the instrument shelter from the drill rig generator. The power line was repaired by the Tonto Drilling crew Friday night (2/22/91) and the station operated normally for the rest of the month (see appendix for details.

Monitoring Program - Meteorological

Continuous wind speed and directional measurements are being made with a recording wind speed/direction sensor system. A data logger and back-up pressure-sensitive recorder is being used to record the wind speed and direction data. The unit is located in a utility container on-site and power is provided by the drill rig system.

This station operated normally with minor adjustment and calibration until the short-circuit on February 22, 1991. After repairs were made to the power line by the Tonto crew the station operated normally for the rest of the month (see appendix for details).

Monitoring Program - Noise

One noise monitoring station is located at the SOH-2 site during drilling. This station was set-up, tested, and calibrated on February 1, 1991, and came on line when the drill rig was powered up on February 4, 1991. This station operated normally with minor adjustment and calibration until the short-circuit on February 22, 1991. After repairs were made to the power line by the Tonto crew the station operated normally for the rest of the month (see appendix for details).

A second noise station was located at the Perry residence,

about a third of a mile north of the SOH-2 drill site. The instrument at this station is powered by solar charged batteries and operated normally for the majority of the month with minor adjustments, including the solar panel tilt, chart recorder speed and ink pen replacement (see appendix for details).

A third noise monitoring station was installed on February 1, 1991, at the Hedtke residence, about 0.4 of a mile east of the SOH-2 site. This monitor is powered by solar charged batteries and operated normally for this reporting period. Adjustments were made on February 4th and 6th on the orientation of the station itself for maximum benefit to the solar panels. Chart jams and the drying up of the ink pens continue to require adjustment. (see appendix for details).

Emissions Reports

An H_2S monitor was located on-site. The average H_2S level measured is about 1 ppb due to natural causes resulting from the decay of vegetation. The Colortek sensor cannisters were deployed around the perimiter of the SOH-2 drill site on February 4, 1991, and were replaced weekly as a matter of routine and showed no indication of any emissions from the well.

V. SOH-3 SITE

No drilling activity has been initiated. Access to the SOH-3 site has not been constructed, nor has the site been cleared or

graded. SOH-3 is scheduled to be located at the True/Mid-Pacific alternate drill site 2 (approximately 3,000 feet north-north-west of the present drill site). All necessary reports have been submitted to DLNR for review and approval. An archaeology survey on the Buffer Zone surrounding the proposed SOH-3 site has been completed and the report is scheduled to be submitted by the Archaeologist by the middle of March.

VI. SOH-4 SITE

Drilling Activity

Drilling is completed. No activity was performed during this period. County of Hawaii landfill officials found the mud pit material unsuitable (too wet) for disposal at County waste sites; therefore, Department of Health officials have given approval to bury the material on-site. The sump material at SOH-4 was buried on site on February 24, 1991. The Landowner, Campbell Estates, has seeded the site with experimental Mamaki, Popiko, and Ohia seeds collected from plants in the nearby area.

Monitoring Program -

Air Quality, Meteorological, Noise and Emissions are not monitored, as drilling has been completed at this site.

APPENDIX

MAINTENANCE REPORTS

SUPPLEMENTARY BILLING

J-032 Friday, 2-1-91 10.00

Meetings were held with residents Perry & Hedkey. Also present were Darby, Olson, Kochy and BLNR. Determinations were made for the location of sound measuring stations.

PERRY SOUND

Solar-powered monitoring station was set-up, tested and calibrated. On Line.

HEDKEY SOUND

Solar-powered monitoring station was set-up, tested and calibrated. On Line.

SOH-2 SOUND

Line-operated monitoring station was set-up, tested and calibrated. Will go on line when the Drill-rig is powered up.

SOH-2 H2S

Ready to go as soon as Drill-rig is powered up.

SOH-2 MET

Anemometer cup broken during move from HGP-1 site. Will be able to replace sensor by Monday and put Met station into operation.

J-035 Monday, 2-4-91 2.00

SOH-2 H2S

Set-up, calibrated and began measurement at 10:30.

SOH-2 MET

Replaced Sensor, rewired connectors, tested and recalibrated. On line at 10:30.

SOH-2 SOUND

Has been inoperative until 10:00. Rig crew forgot to plug in power cable. Now fully on-line.

PERRY SOUND

Pen ran dry. Lost approximately 60 hours data over the weekend.

HEDKEY SOUND

Operating normally. Rewired main batter supply and raised instrument shelter.

COLORTEK

Deployed colortek cannisters around the perimiter of the Drill site.

J-037 Wednesday, 2-6-91 2.00

SOH-2 H2S

Operating normally. No adjustments necessary.

SOH-2 MET

Operating normally. No adjustments necessary.

SOH-2 SOUND

Operating normally. Renewed chart.

PERRY SOUND

Operating normally. Renewed chart.

HEDKEY SOUND

Operating normally. Main battery weak. Renewed chart. Re-orientated Solar-panel.

J-039 Friday, 2-8-91 3.00

SOH-2 H2S

Operating normally. Full calibration. Minor adjustments.

SOH-2 MET

Operating normally. Replaced chart.

SOH-2 SOUND

Operating normally. Full calibration. Minor adjustments.

PERRY SOUND

Operating normally. Full calibration. Minor adjustments.

HEDTKE SOUND

Pen ran dry. Some data lost. Replaced pen and chart. Full calibration, minor adjustments

COLORTEK

Replaced cards. No visible color change.

J-042 Monday, 2-11-91 2.00

SOH-2 H2S

Operating normally. No adjustments required.

SOH-2 MET

Operating normally. Replaced chart.

SOH-2 SOUND

Operating normally. Replaced repaired cable to Microphone basket and installed battery charger.

PERRY SOUND

Chart ran out. Lost about 12 hours data. Replaced chart and adjusted solar-panel tilt.

HEDTKE SOUND

There were several chart jams resulting in the loss of an unknown amout of data.

J-044 Wednesday, 2-13-91 2.00

SOH-2 H2S

Operating normally. No adjustments required.

SOH-2 MET

Operating normally. Chart O.K.

SOH-2 SOUND

Operating O.K., but recorder showed apparent high zero trace. Recalibrated. Recorder was 3 db high.

PERRY SOUND

Operating normally. No adjustments required.

HEDTKE SOUND

Chart badly jammed. Lost 46 out of 48 hours data. Replaced main battery and adjusted recorder brake.

J-046 Friday, 2-15-91 3.00

SOH-2 H2S

Inoperative--No power. Checked instrument and renewed chart, but unable to calibrate.

SOH-2 MET

Inoperative--No power. Checked recorder and sensors

SOH-2 SOUND

Inoperative--Only recorder operational - trace was 2 db high so re-adjusted zero down 2 db.

PERRY SOUND

Operating normally. Full calibration. Minor adjustments

HEDTKE SOUND

Two chart jams. Lost 19-20 hours out of 48. Made further adjustments to recorder brake and ran full calibration. Minor meter adjustment, no recorder adjustment necessary.

COLORTEK

Checked colortek cards. No visible color change.

J-049 Monday, 2-18-91 2.00

SOH-2 H2S

Operating normally. Replaced Lead Acetate. Full zero and span calibration. Minor adjustments.

SOH-2 MET

Operating normally. Renewed chart.

SOH-2 SOUND
Operating normally. Replaced pen.
PERRY SOUND
Pen ran dry. Lost 47 hours data. Replaced pen.
HEDTKE SOUND
Chart recorder jammed. Collected only 12 out of 72 hours data.

J-051 Wednesday, 2-20-91 2.00
SOH-2 H2S
Operating normally. No adjustments required.
SOH-2 MET
Operating normally. Renewed chart.
SOH-2 SOUND
Operating normally. Very heavy rain.
PERRY SOUND
Operating normally. Very heavy rain.
HEDTKE SOUND
Operating normally. Heavy rain.

J-053 Friday, 2-22-91 4.00
SOH-2 H2S
Inoperative...Power to instruments has been off for at least 20 hours. Found short-circuit in power supply line to instrument shelter from drill-rig generator. The Tonto crew will replace or repair the line within the next few hours. Unable to test or calibrate.
SOH-2 MET
Same as above
SOH-2 SOUND
Same as above.
PERRY SOUND
Operating normally. Full calibration. Adjusted sound meter, chart recorder O.K.
HEDTKE SOUND
Chart jammed again. Lost 22 hours data. Replaced pen and batteries. Full calibration. Adjusted sound meter but no adjustments required for chart recorder
COLORTEK
Replaced colortek cards. No visible color change.

J-056 Monday, 2-25-91 2.00
SOH-2 H2S
Operating normally. Power was restored by the Tonto crew sometime Friday night. Everything O.K. now. Ran full calibration and made minor adjustments.
SOH-2 MET
Operating normally. Renewed chart. Calibration O.K.
SOH-2 SOUND
Operating normally. Chart recorder battery charged O.K.
PERRY SOUND
Operating normally. Renewed chart. Batteries O.K.
HEDTKE SOUND
Reading zero. Found one of the sound meter batteries dead. Possible internal short. Replaced batteries and restored normal operation. Lost about 8 hours data.

J-058 Wednesday, 2-27-91 2.00
SOH-2 H2S
Operating normally. Minor adjustment to Optics system.
SOH-2 MET
Operating normally. Chart O.K.
SOH-2 SOUND
Operating normally. Chart & Pen O.K.
PERRY SOUND
Operating normally. Chart, Pen & Batteries O.K.

HEDTKE SOUND
Operating normally. Chart, Pen & Batteries O.K.

J-060 Friday, 3-1-91 3.00

SOH-2 H2S
Operating normally. Replaced chart & Lead-Acetate. Ran zero and span calibration. Minor adjustments to range, optics, zero and span.

SOH-2 MET
Operating normally. Renewed chart. Checked calibration

SOH-2 SOUND
Operating normally. Renewed chart. Full calibration. No adjustments to meter. Minor adjustment to recorder.

PERRY SOUND
Chart jammed. A few hours data lost. Replaced chart and ran full calibration. No adjustment to sound meter but minor adjustment to recorder.

HEDTKE SOUND
Operating normally. Renewed chart. Full calibration. Adjusted meter to 110.0 from 110.2. No adjustments required for recorder. Pen and batteries O.K.

COLORTEK
Replaced colortek cards. No color change visible.

J-032 # Friday 2-1-91

Meetings were held with ~~Residents~~ Residents Perry & Hedley. Also Present were Darby - Olsen - Rocky & BLM. Inspected Sites for location of Sound Monitoring Station.

Perry Solar Powered Sound Monitoring Station was setup, Tested & Calibrated - fully on line.

Hedley Solar Powered Sound Monitoring Station was setup, Tested & Calibrated - fully on line.

SOH-2 - Line operated Sound monitoring station was setup. Tested & Calibrated - Will not be operational until Drill Rig becomes powered up (Tomorrow) - Also - only Temporary Microphone Hook-up made - Microphone cable is defective and must be replaced by Mfg. Temporary Hook-up will be adequate until New Cable arrives.

SOH-2 Rig 3

Ready to operate when Drill Rig goes on line.

SOH-2 MoC

Anemometer Cup broken - Will be able to Replace the entire sensor Head on Monday.

J-035 Monday 2-4-91

SOH-2 Rig 3

Setup - Calibrated & Began Measurements @ 1030.

SOH-2 MoT

Replaced Sensors - Removed - Tested & Calibrated - GV Line.

Colstrip.

Deployed Canisters & Collected Sand.

Perry Sound

Pen Ran Dry - Lost about 60 Hours data.

Hedley Sound

operating Normally - Rewind - Retrieved station

SOH2 Sound

Inoperative - No Power - Restored Power - Tested & Calib.

J-037 Wednesday 2-6-91

SOH-2 Hz 3 Range 0 - 2 ppb

Flow steady @ 3.0, chart + Lead Acetate O.K.

Tygon Dry - Pump + Bubbler O.K.

Check steady @ 29.6%

Optics 2250 - 2230, down 20 ea, adj to 2230 - 2230

Range - High LL Low LL

Zero Calib LL 0 0 LO

SOH-2 Met

Operating Normally - Chart O.K.

SOH-2 Sound 0920 Clouds 30% Calm

Operating Normally - Removed Chart

Redoubt Sound 0850 Clouds 20% Calm

Operating Normally - Removed Chart - Pen O.K. - Main Batt. 12.6 - Metro Batteries 1216 - 1222, Spare Batt 1260 - 1260

Hedley Sound 0825 Clouds 40% WSW 20 @ 7-8

Operating Normally - Removed Chart - Pen O.K. - Main Batt 5.56

Metro Batt 1180 - 1162 (swapped) - Spare Batt. 1216 - 1214.

Changed Orientation of Solar Panel because Main Battery Wasn't receiving sufficient Charge

J-039 Friday 2-8-91

SOH-2 Hz 3 Range 0 - 2 ppb

Flow steady @ 3.0, Removed Chart - Lead Acetate O.K.

Tygon Dry - Pump + Bubbler O.K.

Check 30.3%, up .7%

Optics 2260 - 2280, up 20 ea, Adj to 2280 - 2280

Range: High LL low LL

Zero Calib 29 L 2 0 0

Span Calib - Exp 50 50 50 50 (Span Pot) 50

Act 31 32 49 49 (Height) 50

SOH-2 Met

Operating Normally - Replaced Chart

CCHORTES

Replaced Cards - No visible color change.

Hedley Sound 0800 Clouds 10% Calm

Pen Ran Dry - Some data lost - Replaced Pen + Chart.

Main Batt 11.72 - Metro Batteries 1214 - 1222. Spare Batteries 1218 - 1210 - Full Calibration - Adj Metro to 11.0 from 109.8 - Adjust Recorder down 1/2 Ht.

FRIday 2-8-91 (cont)

Penny Sound 0830 Clouds 10%, Calm

Operating Normally - Chart + Pen OK Main Batt 11.72 Meter Batt 12.01 - 12.02, Spares 1243 - 1245. Full Calibration - Adj Meter to 110.0 from 109.2 - No adj Required for Recorder.

SOH-2 Sound 0915 Clouds 25% W/S + Dir 250 @ 2-3

Operating Normally - Chart + Pen OK Full Calibration - Adj Meter to 110.0 from 109.6 - Adj Recorder down ½ dB.

S/OH Monday 2-11-91

SOH-2 H2S Range 0 - 2ppb

Flow steady @ 3.0, Chart + Lead-Acetate OK

Tygon Dry - Pump + Bubbler OK

Check 30.1%, down .2%

Optics 2280 - 2270, up 10, adj to 2290 - 2290

Range - High 44 Low 11

Zero Calib 27 6 1 0

SOH-2 Met

Operating Normally - Replaced Chart

Nedtke Sound 0830 Clouds 90% Calm (Light Rain)

Several Chart Jams - Some Data Lost - Main Batt 5.36 Meter Batt 7.17 - 8.78 - Replaced with Spares 1211 - 12.08. Will have to Replace Main Batt + Charge at home -

Penny Sound 0850 Clouds 80% Calm

Chart Ran out - Lost about 12 Hours - Replaced - Main Batt 12.46 - Meter Batt 1174 - 1178 - Exchanged with Spares 1247 - 1247 - Adjusted Solar Panel Tilt.

SOH-2 Sound 0932 Clouds 35% W/S + Dir 180° @ 3-4

Operating Normally - Installed Repaired 50' Cable and placed Mike in Basket. Sound Level dropped 6-7 dB. Also installed Battery Charger + Battery in Recorder Circuit to Keep Recorder operating even with Power off.

J-046 Wednesday 2-13-91

SOH-2 H_2S Range 0-200 ppb

Flow steady @ 3.0, Chart + lead Acetate OK
Pump + Orifice - OK
Check 29.7%, down .2%
Optics 2180-2150, down 30 — No Adj.
Range - High 11 Low 11
Zero Calib 28 28 5 28

SOH-2 Met

Operating Normally - Chart OK

Hedille Sound 0815 Clouds 40% WS+DIR 180 @ 2-3
Chart Jams - last 46 hours data - suspect Main Batt problem.
Replaced Main Batt (1251) Meter Bat 11.72 - 11.77. Spare Batt 1270-1264 - Also Adjusted Recorder Brake.

Penny Sound 0835 Clouds 60% WS&DIR 270@2-3
Operating Normally - Main Batt 12.63, Meter Bats 1227-1230
Spare Bat 1261-1260

SOH-2 Sound

Operating Normally but Recorder trace shows high zero.
Recalibrated - Meter OK @ 110.1, but Recorder was about 3 dB high - Adjusted - Now OK

J-046 Friday 2-15-91

SOH-2 H_2S Range 0-200's

Inoperative due to No Power - Checked Instrument and Removed Chart - but, unable to Calibrate

SOH-2 Met

Inoperative due to No Power - checked sensors + Recorder

SOH-2 Sound 0815 Clouds 90% WS+Dir 280@2-3
Power off - only Recorder Operative - Replaced Chart
Recorder Batt @ 12.12 - Adj Recorder down 2 dB.

Hedille Sound 0815 Clouds 100% - Rain Calm
Chart Jammed - collected 17.2 hours of 48.
Exchanged Meter Batteries with spares - Full Calibration
~~Penny Sound~~ Adj Meter to 110.0 from 110.4 — No Adjust To Recorder

Penny Sound 0835 Clouds 100% Calm
Operating Normally - Full Calib. Adj Meter to 110.3 from 110.4
Recorder was 2 dB high.

Colonel

Checked Candy — No Visible Color Change

J-054 Monday 2-18-91

SOH-2 Hz's — Range 0-3 ppb

Flow steady @ 3.0, Chart OK - Replaced heat Aerotite

Tygon Dry - Pump + Bubbler O.K

Check 30.5 To, up . 2%

Optics 2300-2320, up 20 — adj to 2320-2520

Range - High Lil Low Lil

Zero Calib 28 5 3 0

Span Calib - exp 50 50 50 50 (span pot) 50

Act 33 45 49 51 (comp Pot) 50

SOH-2 Met

Operating Normally - Renewed Chart

SOH-2 Sound 0920 Clouds 70% WSW 20 @ 4-5

Operating Normally - Replaced pen.

Penny Sound

Pen Ran Dry - Lost 47 Hours - Replaced Pen - Main Bat 1237

Meta-Bats 1197-1185 - Spares 1232-1235

Heitze Sound

Recorder Jammed - Lost 60 Hours -, Main Bat 12.02

Meta Bats 12.18-12.27 - Spares 1206-1205

J-055 Wednesday 2-20-91

SOH-2 Hz S — Range 0-2 ppb

Flow steady @ 3.0, Chart + Leak Aerotite OK

Tygon Dry - Pump + Bubbler O.K

Check Steady @ 30.5 To

Optics Steady @ 2330-2330

Range - High Lil Low Lil

Zero Calib 27 2 3 1 0

SOH-2 Met

Operating Normally - Chart OK

SOH-2 Sound 0920 Clouds 100% Rain Calm.

Operating Normally - Chart + Pen OK

Penny Sound 0830 Clouds 100% Rain Calm

Operating Normally - Chart - Pen + Batteries O.K

Heitze Sound 0828 Clouds 100% Rain Calm

Operating Normally - Chart - Pen + Batteries O.K

NAME EXPERIMENT NO.

J-053 Friday 2-22-91

SOH-2 H_2S Range 0 - 2ppb

Power has been off for Past 20 Hours due To Short Circuit between instrument Shelter & Drill Rig. Tanto Crew will Replace Cable within next few hours - Unable To Calibrate Instruments.

SOH-2 Met

No Power past 20 Hours - No Calibration

SOH-2 Sound

No Power past 20 Hours - No Calibration

Perry Sound 0855 Clouds 70% Calm

Operating Normally - Main Batt (1186) Replaced with Spare (12.15)

Meter Batteries (1186-1141) Replaced with spares (1228-1231)

Full Calib. - Adj Meter to 110.0 from 100.2 - Recorder OK

Wildcat Sound 0830 Clouds 75% Calm

Chart Jammed - lost 22 Hours - Main Batt OK @ 1215

Meter Batteries (1168-1195) Replaced with spares (1229-1229)

Full Calib. Adj Meter to 110.0 from 109.8 - Recorder OK

Colortec

Serviced Colortec Cards - No Visible Color Change

J-054 Monday 2-25-91

SOH-2 H_2S Range 0 - 3 ppb

Flow Adj. to 3.0 - Renewed Chart Lead Acetate O.K.

Drained Typon - Pump & Bubbler OK

Check 29.9%, down .1%

Optics Steady @ 2270-2270

Range - High 1:1 Low 1:2

Zero Calib 22 6 - 0 1 0

Span Calib - Exp 50 50 50 50 (Span Pot) 50

Act 31 42 48 49 (% Right) 50

SOH-2 Met

Operating Normally - Renewed Chart - Calib Check OK

SOH-2 Sound 0912 Clouds 100% WS & DIR 340 @ 5-6

Operating Normally - Chart Drive Battery Recharged OK

Perry sound 0845 Clouds 100% WS & DIR 250 @ 2-3

Operating Normally - Main Batt 12.14 - Meter Batts 1202-1196

Spare Batt. 12.15-12.14 - Renewed Chart

Wildcat sound 0830 Clouds 100% - Rain Calm

Zero Reading - 1 Meter Battery Failed - Main Batt 12.13

Meter Batt 1128 (4.8V) - Replaced with Spares 12.13-12.14

NAME EXPERIMENT NO.

J-058 Wednesday 2-27-91

SOH-2 H2S Range 0-2 ppb

Flow steady @ 3.0 Chart + lead Acetate O.K.

Tygon Dry - Pump O.K. - Filled Bubbler

Check 30-29, up .3%

Optics 2310 - 2320, up 20 -, Adj: to 2330-2730

Range - High 1:1 Low 1:1

Zero Calib 28 2 2 @

SOH-2 Met

Operating Normally - Chart O.K

SOH-2 Sound 0930 No Clouds WS & DIR 360 @ 2-3

Operating Normally - Chart & Pen O.K. - Batt O.K

Peggy Sound 0845 Clouds 10% Calm

Operating Normally - Chart & Pen OK - Main Batt 12.3 v

Meter Batt 1170 - 1180 - Spares 12.3 c - 12.3 c

Hattie Sound 0815 Clouds 20% Calm

Operating Normally - Chart + Pen O.K. - Main Batt 12.2 c

Meter Batt 1194 - 1188, No Spare

J-060 Friday 3-1-91

SOH-2 H2S Range 0-2 ppb

Flow adj. to 3.0, Replaced Chart - Replaced lead Acetate

Tygon Dry - Pump + Bubbler O.K

Check Steady @ 30.2 - Adj: to 32.8%

Optics 2330-2340 - up 10 -, adj. to 2340-2340

Range - High 1:1 Low 1 ppb Low, adj. For 1:1

Zero Calib 32 - 0 5 - 0 (Zero & Right) 0

Span Calib Exp 50 50 50 50 (span Left) 50

Act 26 39 47 48 (½ Right) 50

SOH-2 Met

Operating Normally - Renewed Chart - Calibrations O.K

SOH-2 Sound Clouds 10% WS + DIR 350° @ 4-5

Operating Normally - Renewed Chart - Pen OK. Full Calib -

No Adj to Meter - Adj: Recorder down 2 dB

Penny Sound. 0845 No Clouds . Calm

Chart Jammed - A few spoons date was 105 f. Replaced Chart,

Pen OK - Main Batt O.K @ 12.3 v - Met Batt 1178-1159, Replaced

with Spares @ 1237-1237 Full Calib - only minor Adj. to Recorder

Hattie Sound 0840 No Clouds Calm.

Operating Normally - Renewed Chart - Pen OK - All Batteries

O.K - Full Calib - Adj Meter to 10.0 From 11.0-2

H2S CHART REDUCTION -- SOH-2 Station

From 2-1-91 to 2-28-91

HOUR:	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	Avg	Max	Total
0201	ǂ	ǂ	ǂ	ǂ	ǂ	ǂ	ǂ	ǂ	ǂ	ǂ	ǂ	ǂ	ǂ	ǂ	ǂ	ǂ	ǂ	ǂ	ǂ	ǂ	ǂ	ǂ	ǂ	ǂ	0	0	0
0202	ǂ	ǂ	ǂ	ǂ	ǂ	ǂ	ǂ	ǂ	ǂ	ǂ	ǂ	ǂ	ǂ	ǂ	ǂ	ǂ	ǂ	ǂ	ǂ	ǂ	ǂ	ǂ	ǂ	ǂ	0	0	0
0203	ǂ	ǂ	ǂ	ǂ	ǂ	ǂ	ǂ	ǂ	ǂ	ǂ	ǂ	ǂ	ǂ	ǂ	ǂ	ǂ	ǂ	ǂ	ǂ	ǂ	ǂ	ǂ	ǂ	ǂ	0	0	0
0204	ǂ	ǂ	ǂ	ǂ	ǂ	ǂ	ǂ	ǂ	ǂ	ǂ	ǂ	1	2	2	3	3	3	2	2	2	2	2	2	2	1	3	28
0205	2	2	2	2	2	2	2	ǂ	ǂ	1	1	1	2	ǂ	ǂ	2	2	2	2	2	2	2	2	1	2	2	36
0206	1	1	1	ǂ	ǂ	ǂ	ǂ	ǂ	ǂ	1	0	1	2	2	1	1	1	2	2	2	1	1	1	1	1	2	22
0207	1	0	1	1	1	1	1	ǂ	1	0	1	1	1	2	2	1	2	2	2	1	1	1	2	1	1	2	27
0208	1	1	1	1	1	0	1	0	0	1	2	2	3	2	2	2	2	3	3	2	2	2	2	2	2	3	38
0209	1	2	2	1	1	1	1	2	1	ǂ	ǂ	ǂ	1	1	2	2	2	2	1	0	1	1	1	0	1	2	26
0210	ǂ	1	0	1	2	2	2	2	ǂ	3	2	2	2	2	2	2	2	2	2	2	2	2	1	1	2	3	39
0211	1	2	2	1	1	1	1	2	2	1	1	1	2	2	2	2	2	2	2	ǂ	ǂ	2	2	2	2	2	36
0212	2	2	1	1	2	2	2	1	2	1	0	0	1	1	2	2	2	ǂ	ǂ	2	2	2	2	2	1	2	34
0213	2	2	2	1	1	1	1	1	1	1	1	0	2	2	1	2	2	2	2	2	ǂ	3	2	2	2	3	36
0214	1	1	1	2	1	2	1	1	0	1	ǂ	0	0	1	2	2	2	3	2	3	3	2	2	1	1	3	34
0215	0	1	1	1	2	2	2	ǂ	ǂ	ǂ	2	1	1	2	2	2	2	1	0	0	1	1	1	1	1	2	26
0216	1	1	1	1	1	1	2	ǂ	ǂ	ǂ	1	2	2	2	2	3	2	1	2	2	2	2	2	2	1	3	35
0217	2	2	1	1	1	2	2	ǂ	ǂ	ǂ	2	1	2	3	3	2	2	2	2	2	1	1	1	2	2	3	37
0218	2	2	2	2	2	2	2	ǂ	ǂ	ǂ	2	2	2	2	2	2	2	2	1	1	2	1	1	1	2	2	37
0219	2	2	1	1	1	1	1	2	1	1	2	2	2	2	1	2	2	2	1	0	1	0	1	1	1	2	32
0220	1	0	1	1	1	2	1	1	2	2	1	1	1	1	1	1	2	1	1	1	1	1	1	2	1	2	28
0221	1	1	1	1	1	2	2	2	1	2	ǂ	ǂ	ǂ	ǂ	ǂ	ǂ	ǂ	ǂ	ǂ	ǂ	ǂ	ǂ	ǂ	ǂǂ	1	2	14
0222	ǂ	ǂ	ǂ	ǂ	ǂ	ǂ	ǂ	ǂ	ǂ	ǂ	ǂ	ǂ	ǂ	ǂ	ǂ	ǂ	ǂ	ǂ	ǂ	ǂ	ǂ	ǂ	ǂ	ǂǂ	0	0	0
0223	ǂ	ǂ	ǂ	ǂ	ǂ	ǂ	ǂ	ǂ	ǂ	ǂ	ǂ	ǂ	ǂ	ǂ	ǂ	ǂ	ǂ	ǂ	ǂ	ǂ	ǂ	ǂ	ǂ	ǂǂ	0	0	0
0224	2	1	1	1	1	0	1	1	0	0	0	0	1	1	1	1	1	0	0	2	2	1	1	1	1	2	20
0225	2	2	2	1	2	2	1	2	2	ǂǂ	2	2	2	2	1	1	1	0	1	0	1	1	2	1	1	2	33
0226	2	2	2	1	2	1	2	2	2	2	2	2	2	2	ǂǂ	0	1	1	0	0	1	2	1	1	1	2	33
0227	1	1	1	1	0	1	2	1	2	2	1	2	2	2	ǂǂ	2	2	1	1	2	2	2	1	1	1	2	33
0228	1	2	1	1	1	1	2	ǂǂ	2	2	1	2	3	2	2	2	3	3	2	2	2	2	2	2	2	3	43
																											727
AVG.	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	1	1	1	1	1	1	1	1		
MAX.	2	2	2	2	2	2	2	2	2	3	2	2	3	3	3	3	3	3	3	3	3	3	2	2		3	

ǂǂ=Power or Equip. failure: ǂ=Calibration

Meteorology Station Log
SOH-2
2-1-91 to 2-28-91

Time	W/D	W/S	W/D	W/S	W/D	W/S	W/D	W/S
	0201		0202		0203		0204	
0000	-	-	-	-	-	-	-	-
0100	-	-	-	-	-	-	-	-
0200	-	-	-	-	-	-	-	-
0300	-	-	-	-	-	-	-	-
0400	-	-	-	-	-	-	-	-
0500	-	-	-	-	-	-	-	-
0600	-	-	-	-	-	-	-	-
0700	-	-	-	-	-	-	-	-
0800	-	-	-	-	-	-	-	-
0900	-	-	-	-	-	-	-	-
1000	-	-	-	-	-	-	-	-
1100	-	-	-	-	-	-	180	5
1200	-	-	-	-	-	-	185	6
1300	-	-	-	-	-	-	180	6
1400	-	-	-	-	-	-	175	7
1500	-	-	-	-	-	-	175	7
1600	-	-	-	-	-	-	175	5
1700	-	-	-	-	-	-	165	4
1800	-	-	-	-	-	-	165	3
1900	-	-	-	-	-	-	175	2
2000	-	-	-	-	-	-	190	2
2100	-	-	-	-	-	-	205	2
2200	-	-	-	-	-	-	200	2
2300	-	-	-	-	-	-	210	2

Time	W/D	W/S	W/D	W/S	W/D	W/S	W/D	W/S
	0205		0206		0207		0208	
0000	205	2	85	2	215	2	175	2
0100	180	3	85	2	215	2	190	2
0200	195	2	85	2	215	2	190	2
0300	200	2	-	-	215	2	200	2
0400	200	2	-	-	220	2	190	2
0500	200	2	-	-	220	2	195	2
0600	200	2	-	-	220	2	210	2
0700	-	-	-	-	-	-	210	2
0800	-	-	-	-	-	-	215	2
0900	190	4	-	-	110	3	180	3
1000	165	4	120	4	160	3	180	4
1100	150	4	130	4	130	4	190	4
1200	170	4	135	4	125	5	160	5
1300	-	-	140	5	115	6	150	5
1400	-	-	145	5	120	6	150	5
1500	-	-	165	4	110	5	185	5
1600	85	2	145	3	140	5	175	4
1700	85	2	165	2	135	6	170	2
1800	85	2	105	2	130	5	170	2
1900	85	2	115	2	135	3	185	2
2000	85	2	185	2	150	2	195	2
2100	85	2	205	2	160	2	200	2
2200	85	2	210	2	170	2	205	2
2300	85	2	210	2	180	2	205	2

Time	W/D	W/S	W/D	W/S	W/D	W/S	W/D	W/S
	0209		0210		0211		0212	
0000	210	2	200	2	165	2	175	3
0100	210	2	200	2	150	3	215	2
0200	210	2	200	2	180	2	215	2
0300	235	2	200	2	160	2	215	2
0400	260	2	165	3	175	3	215	2
0500	260	2	125	4	180	2	215	2
0600	260	2	130	4	180	2	205	2
0700	260	2	110	5	175	3	165	2
0800	260	2	120	5	170	3	190	2
0900	245	2	140	5	180	3	195	2
1000	150	5	135	6	-	-	200	2
1100	160	2	145	6	-	-	180	2
1200	160	2	150	5	-	-	155	2
1300	180	2	145	5	-	-	145	3
1400	180	2	140	6	-	-	130	4
1500	180	2	140	5	-	-	135	6
1600	180	2	135	4	170	5	140	5
1700	180	2	145	3	170	5	135	5
1800	185	2	140	2	150	5	150	6
1900	190	2	135	2	140	5	160	4
2000	190	2	140	2	130	5	135	3
2100	195	2	165	2	130	4	155	2
2200	195	2	140	2	145	4	155	2
2300	195	2	140	2	175	3	155	2

Time	W/D	W/S	W/D	W/S	W/D	W/S	W/D	W/S
	0213		0214		0215		0216	
0000	155	2	280	3	50	7	255	3
0100	155	2	270	4	15	2	60	4
0200	155	2	265	5	65	6	80	2
0300	155	2	280	5	70	4	80	2
0400	155	2	265	3	240	3	115	4
0500	175	2	250	4	360	5	125	5
0600	220	2	265	4	60	9	125	5
0700	220	2	270	3	-	-	-	-
0800	220	2	275	5	-	-	-	-
0900	225	3	275	5	-	-	-	-
1000	325	5	295	4	95	7	135	6
1100	50	4	30	4	80	7	120	7
1200	50	4	80	5	80	8	130	6
1300	25	4	75	8	85	6	140	5
1400	315	5	85	8	85	4	145	5
1500	335	5	90	8	90	3	165	2
1600	340	5	70	8	90	2	135	2
1700	345	5	60	5	90	2	135	2
1800	320	5	60	4	80	2	120	3
1900	290	5	70	3	80	2	110	3
2000	50	3	70	4	80	2	115	4
2100	55	2	65	2	80	2	110	3
2200	55	2	65	3	80	2	105	2
2300	360	4	60	3	90	2	160	2

Time	W/D	W/S	W/D	W/S	W/D	W/S	W/D	W/S
	0217		0218		0219		0220	
0000	180	2	125	3	270	3	180	3
0100	180	3	115	4	265	3	270	4
0200	90	2	105	4	265	2	260	4
0300	90	2	105	3	265	2	275	4
0400	90	2	100	3	260	3	270	3
0500	95	2	95	3	255	3	310	4
0600	115	6	110	2	255	3	180	4
0700	–	–	–	–	260	3	50	4
0800	–	–	–	–	265	4	260	5
0900	–	–	–	–	315	4	265	7
1000	110	5	120	6	350	6	270	7
1100	105	5	95	7	345	6	295	9
1200	120	6	95	7	340	9	10	4
1300	120	6	115	8	10	9	160	3
1400	115	5	85	7	10	10	200	2
1500	100	4	105	5	35	10	200	2
1600	90	3	90	5	55	4	250	3
1700	90	3	55	7	360	4	285	3
1800	95	4	85	3	300	4	315	3
1900	110	4	85	3	310	3	270	3
2000	120	4	70	7	275	3	260	3
2100	115	4	260	4	265	3	260	2
2200	125	3	255	5	260	2	260	3
2300	120	3	255	5	70	2	265	3

Time	W/D	W/S	W/D	W/S	W/D	W/S	W/D	W/S
	0221		0222		0223		0224	
0000	270	4	–	–	–	–	170	3
0100	265	4	–	–	–	–	185	2
0200	265	4	–	–	–	–	185	2
0300	260	4	–	–	–	–	190	2
0400	265	4	–	–	–	–	195	2
0500	265	4	–	–	–	–	200	4
0600	260	4	–	–	–	–	220	4
0700	270	5	–	–	–	–	225	3
0800	265	5	–	–	–	–	205	6
0900	280	4	–	–	–	–	215	6
1000	315	4	–	–	–	–	210	7
1100	–	–	–	–	–	–	210	8
1200	–	–	–	–	–	–	205	9
1300	–	–	–	–	–	–	220	9
1400	–	–	–	–	–	–	280	8
1500	–	–	–	–	–	–	35	3
1600	–	–	–	–	–	–	210	5
1700	–	–	–	–	–	–	195	5
1800	–	–	–	–	–	–	315	4
1900	–	–	–	–	–	–	285	5
2000	–	–	–	–	–	–	315	5
2100	–	–	–	–	–	–	25	7
2200	–	–	–	–	–	–	10	8
2300	–	–	–	–	135	4	15	7

Time	W/D	W/S	W/D	W/S	W/D	W/S	W/D	W/S
	0225		0226		0227		0228	
0000	10	7	265	3	45	3	250	2
0100	15	8	270	3	45	2	245	2
0200	15	7	270	2	45	2	245	2
0300	15	7	270	2	45	2	245	2
0400	345	6	270	3	45	2	245	2
0500	315	5	270	3	45	2	245	2
0600	290	4	270	3	45	2	245	2
0700	300	3	265	3	45	2	-	-
0800	325	4	300	4	45	2	245	2
0900	-	-	335	5	260	3	245	2
1000	340	5	340	6	350	4	245	2
1100	345	4	15	7	35	5	230	2
1200	330	4	30	8	45	5	150	3
1300	320	4	35	7	70	4	35	3
1400	330	4	-	-	-	-	55	3
1500	310	4	40	7	85	4	120	5
1600	295	3	40	7	95	2	140	3
1700	275	3	30	5	95	2	135	3
1800	270	3	45	3	290	3	125	2
1900	270	3	45	3	265	4	130	2
2000	270	3	45	3	255	5	195	2
2100	265	3	45	3	255	4	195	2
2200	265	3	45	3	245	3	195	2
2300	265	3	45	3	250	2	195	2